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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* MARK STEVEN YAMAZAKI, FAZAL URRAHMAN SYED, and MING LANG KUANG

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Appeal 2015-000063[1,2]
Application 13/346,976
Technology Center 3600

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Before PHILIP J. HOFFMANN, CYNTHIA L. MURPHY, and AMEE A. SHAH, *Administrative Patent Judges*.

HOFFMANN, *Administrative Patent Judge*.

## DECISION ON APPEAL

## STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134(a) from the rejection of claims 1, 3–11, and 13–20. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

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[1] Our decision references Appellants' Specification ("Spec.," filed Jan. 10, 2012) and Appeal Brief ("Br.," filed June 25, 2014), as well as the Final Office Action ("Final Action," mailed Dec. 27, 2013) and the Examiner's Answer ("Answer," mailed July 21, 2014). We note that although the Examiner references "the Office action dated February 24, 2014[,] from which the appeal is taken" (Answer 3), this appears to be a typographical error, as the record does not appear to include such an Office Action.

[2] According to Appellants, Ford Global Technologies, LLC is the real party in interest. Br. 2.

According to Appellants, the invention "relate[s] to a control system for controlling distribution of energy from a battery in a powertrain for a hybrid electric vehicle." Spec. ¶ 1. Claims 1, 8, and 15 are the only independent claims. *See* Br., Claims App. We reproduce claims 1 and 15, below, with formatting added, as representative of the appealed claims.

> 1. A method for controlling energy distribution within a HEV powertrain including sensors in signal communication with a controller, the method comprising:
>
> generating, by the controller, a feedforward battery power value in response to input indicative of a driver torque request;
>
> generating, by the controller, a feedback battery power modification value in response to input indicative of actual battery power and the driver torque request;
>
> selectively disabling, by the controller, feedback by setting the feedback power modification value to zero; and
>
> calculating, by the controller, a battery power request based on a sum of the feedforward battery power value and the feedback battery power modification value.
>
> 15. A hybrid electric vehicle comprising:
>
> a control unit configured to generate output indicative of a gear selection in response to a transmission input speed; and
>
> a controller communicating with the control unit and configured to generate output indicative of an engine torque command and a motor torque command in response to input indicative of a driver torque request and actual battery power, and independent of the gear selection.

*Id.*

## REJECTIONS AND PRIOR ART[3]

The Examiner rejects the claims as follows:

I. claim 1 under 35 U.S.C. § 103(a) as unpatentable over Bose (US 8,080,971 B2, iss. Dec. 20, 2011) and De La Salle (US 6,687,582 B1, iss. Feb. 3, 2004);

II. claims 3–5 under 35 U.S.C. § 103(a) as unpatentable over Bose, De La Salle, Yoshida (US 2011/0245034 A1, pub. Oct. 6, 2011), and Mashadi & Emadi, *Dual-Mode Power-Split Transmission for Hybrid Electric Vehicles*, 59 IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY 3223–3232 (2010) (hereinafter "Mashadi");

III. claim 6 under 35 U.S.C. § 103(a) as unpatentable over Bose, De La Salle, and Nakashima (US 6,441,506 B2, iss. Aug. 27, 2002);

IV. claim 7 under 35 U.S.C. § 103(a) as unpatentable over Bose, De La Salle, and Joshi et al., *Modeling and Simulation of a Dual Clutch Hybrid Vehicle Powertrain*, 1666–1673 (2009) (hereinafter "Joshi");

V. claims 8–11 under 35 U.S.C. § 103(a) as unpatentable over De La Salle, Mashadi, and Bose;

VI. claims 13 and 14 under 35 U.S.C. § 103(a) as unpatentable over De La Salle, Mashadi, Yoshida, and Nakashima;

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[3] In the Answer, the Examiner withdraws a rejection under 35 U.S.C. § 101 that the Examiner made in the Final Action. *See* Answer 3; *see* Final Action 6.

VII. claims 15–19 under 35 U.S.C. § 102(b) as anticipated by De La Salle; and

VIII. claim 20 under 35 U.S.C. § 103(a) as unpatentable over De La Salle and Kaneko (US 2008/0190680 A1, pub. Aug. 14, 2008).

*See* Final Action 7–28.

## ANALYSIS

Rejections I–IV

With respect to claim 1, Appellants argue that the obviousness rejection is erroneous because, among other things, neither Bose nor De La Salle discloses using a controller to selectively disable feedback. *See, e.g.*, Br. 7–8. Based on our review, we agree with Appellants, and, thus, we do not sustain the rejection of claim 1.

The Examiner finds that "Bose discloses *selectively disabling feedback* (*see* at least [c]ol[.] 5, lines 42[–]44, feedforward torque adjustment term may be selectively applied to either motor or engine; [c]ol[.] 6, lines 51[–]64, [c]ol[.] 8, lines 10[–]18, driving cycle, performance indices are selected / minimized)." Answer 4. But, none of these portions discloses, to our understanding, disabling feedback. The cited portion of column 5 states that "[a]ll present technology in controlling a fuel cell or battery are based on system internal characteristics, but none of them are formed by using the described mathematics before." Bose, col. 5, ll. 42–45. Column 6 of Bose states, in part:

> The main part of the invention is the control of power flow between the various energy storage device sources. For a vehicle, power requirements are going to vary at different times

> in the driving cycle. Demands could range from drawing large power from the sources while accelerating up hill to supplying regenerative braking power to the sources when going downhill or braking. Also, power needs to flow between the various energy sources in order to maintain the proper charge on the batteries and capacitors. This component of the invention uses optimal control theory to determine the power flow in the various components. A performance index is determined based on the battery state of charge and the fuel cell power output is determined to minimize this index.

*Id.* at col. 6, ll. 51–64. The cited portion of Bose's column 8 states:

> In summary, first, the system dynamics are given by the physics of the problem (1), while the performance index (2) is what is chosen to achieve the desired system response. Second, to achieve different control objectives, different types of performance indices J are selected. Finally, the optimal control problem is characterized by compromises and trade-offs, with different weighting factors in J resulting in different balances between conformability with performance objectives and magnitude of the required optimal controls.

*Id.* at col. 8, ll. 10–18.

Because it is not clear that any of the above-reproduced portions of Bose teach disabling feedback, we do not sustain the rejection of independent claim 1. Further, we do not sustain any of the rejections of claims 3–7 that depend from claim 1, inasmuch as the Examiner does not establish that any other reference remedies the deficiency in the rejection of claim 1.

<u>Rejections V and VI</u>

Appellants argue that the rejection of independent claim 8 is erroneous for reasons similar to those discussed above with respect to claim 1. *See* Br. 10–12. Claim 8 recites a similar limitation regarding selectively disabling feedback. *See id.* at Claims App. Thus, we do not sustain the rejection of independent claim 8 for reasons similar to the reasons we do not sustain the rejection of claim 1. Further, we do not sustain any of the rejections of claims 9–11, 13, and 14 that depend from claim 8, inasmuch as the Examiner does not establish that any other reference remedies the deficiencies in the rejection of claim 8.

Rejections VII and VIII

Appellants argue the rejection of independent claim 15 is erroneous because De La Salle fails to disclose "a controller communicating with the control unit and configured to generate output indicative of an engine torque command and a motor torque command *in response to input indicative of* a driver torque request and *actual battery power*, and independent of the gear selection." Br. 12–13 (emphasis omitted and added). The Examiner relies on column 3, lines 17–22 of De La Salle, for example, to disclose the claim limitation. *See* Final Action 25. Appellants argue, however, that this portion of De La Salle at most discusses "battery health (state of charge)," which is not the same as actual battery power. *See id.* at 13. We agree with Appellants. The cited portion of De La Salle discusses receiving input regarding the state of charge of the battery , i.e., "the present battery capacity as opposed to a percentage of the maximum capacity," generally used to "determine the change in battery capacity over time." MIT Electric Vehicle Team, "A Guide to Understanding Battery Specifications," December 2008, available at http://web.mit.edu/evt/summary_battery_specifications.pdf. The Examiner does not establish that this or any other portion of De La Salle refers to actual battery power as opposed to the battery's capacity. While the Examiner emphasizes statements from De La Salle describing an input including auxiliary loads and electric motor power (*see* Answer 6), it is not reasonably certain that any of these are indicative of actual battery power. Thus, we are unable to sustain the rejection of independent claim 15, or the rejections of claims 16–20 depending from the independent claim, because the Examiner does not establish that any other reference remedies the deficiency in the rejection of claim 15.

## DECISION

We REVERSE the Examiner's anticipation and obviousness rejections of claims 1, 3–11, and 13–20.

## REVERSED